NEWSLETTER

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Newsletter
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AUSTRALIAN SOCIETY FOR LIMNOLOGY

The Australian Society for Limnology is an association of over 425 people with professional or amateur interests related to Australian inland waters. Since its inception in 1961 the Society has played an important role in fostering limnological work in this country. The ASL promotes liaison between limnologists in academic, private and governmental institutions and has a vested interest in the conservation of aquatic and related resources. Annual congresses are held near centres of limnological interest, and the programme includes scientific sessions, field excursions and social activities.

The ASL produces a *Newsletter* with notes on activities, articles of general interest, book reviews and congress announcements; a *Bulletin* of original scientific papers and occasional *Special Publications*. A further publication is the *Directory of Australian Limnologists*.

Membership applications are welcomed; four classes of subscribing membership are available:

Ordinary members	$10.00 p.a.
Student members	$4.00 p.a.
Institutional members	$10.00 p.a.
Sustaining members	Fees on application

Members are entitled to receive the Australian Journal of Marine and Freshwater Research at the reduced rate of $15.00 p.a.

Membership subscriptions cover the period 1 July to 30 June but subscriptions for Aust. J. mar. Freshwat Res. cover the period 1 January to 31 December.

Enquiries relating to membership should be addressed to:

Mrs. M. Hart,
Secretary, ASL.,
C/- Department of Chemistry,
Caulfield Institute of Technology,
P.O. Box 197,
Caulfield East, Victoria,
Australia 3145.

ASL Executive 1980-81

President: Frank Burns

Past-President: Sam Lake

Vice-President: David Mitchell

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Max Finlayson
Leighton Llewellyn
Luisa MacMillan
David Pollard
Phillip Suter
Robert White

Newsletter Editor:

R.W.G. White,
Department of Zoology,
University of Tasmania,
Box 252C, G.P.O.
Hobart, Tasmania,
Australia 7001.

EDITORIAL

Accompanying this Newsletter is an advertising leaflet from a publisher. I know that many people take exception to the vast amount of publisher's blurb which lands on their desks each year, especially as much of it is completely unrelated to their areas of interest. I would ask you, however, to at least read the leaflet enclosed with the present Newsletter and those which you will be receiving with future issues. All will be related to the many facets of limnology. It represents a way in which you can be kept in touch with the recently published literature of your science. It also represents an important source of income to the Society. Distributing an advertising leaflet usually involves the Editor and his band of helpers in a little extra work but no additional financial expenditure for the Society. In fact, each leaflet you receive represents about 20¢ per member income to A.S.L. and that means lower subscriptions - for every 5 leaflets we send you the inevitable subscription increase can be held down by $1.00. A small price to pay for a few minutes perusing a leaflet which, after all, may be advertising just the book or journal you've been looking for.

Robert White

NEWS AND VIEWS

Annual Subscriptions

A few members have still not paid their annual subscription. If you are one of these people, please get a cheque in the post today to Margaret Hart. Individual reminders take time and money!

New "Fauna of Tasmania" Handbook on Molluscs

The "Fauna of Tasmania" Committee has recently published a new handbook. This is Handbook No. 5, "Tasmanian Land and Freshwater Molluscs" by Brian Smith and Ron Kershaw. Both authors are members of ASL. The handbook has an introductory section on molluscs in general, and the Tasmanian fauna in particular. A full checklist of the Tasmanian species is given. Notes on collecting, preserving and the structure of molluscs are included as well as an informative glossary. Fully illustrated keys to species are presented and these are followed by a whole shell animal drawing and brief notes for each species. Detailed distribution maps (including an indication of range in south-eastern Australia) and a comprehensive bibliography complete this handbook. The handbook has 148 pages and the recommended retail price is $5.00. It can be purchased by mail at an inclusive price of $6.00 from:

"Fauna of Tasmania" Office,
University of Tasmania,
Box 252C, G.P.O.,
Hobart, Tasmania.
Australia...7001

Cheques, money orders, etc payable to "University of Tasmania".

Distinguished American Freshwater Biologist to Visit Tasmania

Professor Robert W. Pennak will be visiting Tasmania in March 1982. Prof. Pennak will be studying the hyporhea fauna of stream gravel beds. He will be based at the Department of Zoology, University of Tasmania. Contact person is Dr. Robert White.

ASL Publications

The Society still has good stocks of earlier Bulletins and Special Publications. If your collection is incomplete why not order the missing issues today? A full list of items available was given on page 9 of Volume 19, Number 1 of the Newsletter (May 1981). Orders to Margaret Hart

at the address on page 2. Cheques, etc payable to "Australian Society for Limnology".

"Salt Lakes" edited by Bill Williams.

The Proceedings on the International Symposium on Athalassic (Inland) Salt Lakes, held in Adelaide in October 1979 have now been published by Junk Publishers in their Developments in Hydrobiology series. The book, No.5 in the Developments series, is edited by W.D. Williams. It contains 30 papers and spans 444 pages. It is attractively presented and costs US$95.00. It is obtainable in Australia from D.A. Books Depot, 11-13 Station Street, Mitcham, Victoria 3132. A review will be published in a later issue of the Newsletter.

Membership Directory Up-date

A 'Membership Directory Up-date' form was distributed with the last Newsletter. If you have joined the Society since the last Directory was published, or want to amend your previous entry please get the form back to Margaret Hart immediately.

Forthcoming Special Publications

The Executive recently approved two publications in the Society's 'Special Publications Series'. The first is the proceedings of the management of water quality symposium held at Caulfield Institute of Technology last year. The second is a catalogue of freshwater algal species presently held in culture collections in Australia. The catalogue was compiled by John Box. Both special publications should be distributed to members early in 1982.

Bulletin No. 8 out in March 1982

The next issue of the Bulletin of the Australian Society for Limnology should be available in March 1982. Sufficient papers have now been received to permit the publication of Bulletin No.8, two years after the release of No.7. The Society agreed at its last A.G.M. to continue with the publication of the Bulletin. More papers are required! Send to the Editor, Dr. Robert White, at the address given on page 2.

The Effect of Forestry on the Inland Waters of Tasmania

Frances Michaelis, a graduate of A.N.U. has settled in Launceston after eleven years in New Zealand, the U.K. and East Africa. She has recently received a grant from the Forest Ecology Research Fund to prepare a bibliography of forestry and freshwaters with emphasis on Tasmania. Hopefully, the bibliography can go into CSIRONET, so making it accessible to all interested researchers.

In New Zealand a "Freshwater Bibliography" has been prepared to cover all N.Z. research. A print-out on any lake, river or biological process is

N.Z. research. A print-out on any lake, river or biological process is available, free-of-charge, through the D.S.I.R. Has anyone got ideas about a similar system in Australia. Frances would be interested to hear from them. Her address is:

Dr Frances B. Michaelis,
16 Lanoma Street,
Launceston,
Tasmania 7250.

Call for A.S.L. Bulletin Papers

Enclosed with this Newsletter is a poster calling for papers for the A.S.L. Bulletin. This poster is directed at you, and colleagues who are not members of the Society. Please display the poster on a noticeboard in your unit, section department etc. Publication in the Bulletin is not restricted to members of the Society.

A.S.L. Congress at Griffith, N.S.W.

Later in this Newsletter is the First Notice for the 1982 A.S.L. Congress to be held at Griffith, N.S.W. Please get your Registration Forms back as soon as possible. Early returns help the organizers with their planning.

Members - Lost and Found!!!

The following members are no longer at the addresses in the Society's records. Would anyone knowing their present address please send it to Margaret Hart (address on page 2).

Mr C.J. Bell, formerly of North Fitzroy.
Dr Peter Bell, formerly of the State Pollution Control Board, Sydney.
Mr Richard Bolus, formerly of the Northern Territory.
Mr Arthur Haughey, formerly of South Australia.

The following persons have recently joined A.S.L. Welcome aboard!

J. Firth, N.S.W. Institute of Technology.
P. Hawkins, James Cook University.
John Taylor, Division of Wildlife Research, N.T.
John Bauld, Baas Becking Geobiological Laboratory, Canberra.
Mathew Malick, A.N.U.
Australian Littoral Society, Fig Tree Pocket, Qld.
Lance Lloyd, Rosetrevor, S.A.
Kruno Kukolic, A.C.T.
Brian Davies, University of Cape Town.
John Fryer, Crowsnest, N.S.W.
Michael Jones, Caulfield I.T.
Karen Kool, Mosman, N.S.W.
Elizabeth Craig, Berridale, N.S.W.
Peter Nuttall, Oakenham, Vic.
J.R. Twining, A.A.E.C., N.S.W.

Second International Symposium on Regulated Streams

The Second International Symposium on Regulated Streams will be held at the University of Oslo, Oslo, Norway on 8 - 11 August 1982. The tentative program contains the following themes:

Theory and concepts within the realm of the ecology of regulated streams.

Advances in research on the biological effects of stream regulation.

Ecological principles in the management of regulated streams.

Further information from the symposium organiser:

Dr A Lillehammer
Zoological Museum,
University of Oslo,
Sars gt. 1, Oslo 6
Norway.

Research assistantship in toxicity of pollutants to freshwater animals

John Skidmore, School of Life Sciences, N.S.W. Institute of Technology has recently advertised for a research assistant for his A.W.R.C. funded projec project on the toxicity of common pollutants to Australian freshwater animals. Enrolment for a Master's degree will be encouraged. Applications close on 15 January 1982 so a telephone call to John, on 436 9328 is recommended if you, or anyone you know, are interested in this position.

ASL 1982 CONGRESS

The 1982 ASL Congress will be held on 8-10 May 1982 at Griffith N.S.W. The following constitutes the "First Announcement".

Schedule

Venue: Irrigana Motor Inn, Griffith NSW

Theme: Limnological Consequences of Water Management.
Three keynote speakers on this theme with reference to:
1. Mineral Resource Development
2. Industrial and Urban Development
3. Agricultural Development

Papers: Send titles and abstracts of papers (15 - 20 minutes duration) on this theme, or other aspects of limnology to:

Alan Chick
1982 ASL Congress
C/- CSIRO
Private Mail Bag
Griffith NSW 2680 (069 621700)

by MARCH 1st 1982 using enclosed Form 2.

Jolly lecture: John Kirk

Proposed Programme: Fri. 7 May 1982; 7-10 p.m. Registration and informal gathering at Irrigana Motor Inn (meals will be available to 9.30 p.m.).

Sat. 8 May 1982; 8.30 a.m. - 5 p.m. Paper presentation
8.00 p.m. Congress dinner at Irrigana Motor Inn (neat casual dress please).

Sun 9 May 1982; 9.00 a.m. - 5.00 p.m. Paper presentation and A.G.M. (there will be a joint session with the Australian Society for Phycology and Aquatic Botany (ASPAB) on Sunday).

Sun 9 May 1982; 6.00 p.m. BBQ and traditional bush music at Orlando Winery.

Mon 10 May, 1982. BBQ and field study at Lake Wyangan, Griffith.

Accommodation

Motel: Block booking of 100 beds in shared rooms (2,3, or 4) at Irrigana Motor Inn ($12.50 - $18.00, breakfast extra). Singles also available at same place ($28.00). Other Motel and Hotel accommodation also available.

Camping: At CSIRO Research Station, 5 km from Griffith. FREE.

Caravans: 13 vans to sleep 3 people each at Griffith Tourist Park ($15/van).

Contact Alan Chick for bookings, use Form 2.

Transport

Driving: From Melbourne - 6 hours via Shepparton - Tocumwal - Jerilderie
(Visit Chateau Tahbilk and Mitchelton wineries north of Seymour)

: From Melbourne - 7 hours via Rutherglen - Corowa - Berrigan
(Visit wineries at Rutherglen - choice of 16).

: From Adelaide - 10 hours via Mildura.
(Many wineries liberally scattered en route).

: From Adelaide - 8-9 hours via Murray Bridge - Ouyen - Balranald

: From Sydney - 8 hours via Yass.

: From Canberra - 4 hours.

: From Brisbane - 15 hours via Newell Highway.

: If you require transport from Melbourne contact Luisa MacMillan at Caufield Institute of Technology (573 2108), P.O. Box 197, Caufield East, Vic. 3145.
Or from Sydney contact Leighton Llewellyn or Dave Pollard NSW State Fisheries, 211 Kent Street, Sydney (237 6566).

Bus : Pioneer Ansett

: Greyhound

Air:	Airlines of NSW from Sydney.	
:	Western Airlines from Melbourne and Canberra.	
	Friday 7th May (prices Sept. 1981)	
	From Sydney an evening flight arrives in Griffith at 7.20 p.m.	$72.50
	From Melbourne an afternoon flight arrives in Griffith at 3.20 p.m.	$62.00
	From Canberra a morning flight arrives in Griffith at 10.30 a.m.	$58.00
	Brisbane and Adelaide link with Sydney and Melbourne flights.	

Field Study and BBQ at Lake Wyangan Mon. 10 May 1982

It is proposed to organise a one day study of this virtually unknown lake near Griffith. The lake serves as a drainage reservoir for the irrigation system and has been altered considerably from a shallow depression in about 1950 to a permanent body of water (average depth 3 m). It is divided into two sections separated by a causeway. The water level in the northern section is regulated by pumping into the southern section which connects with the main drain of the irrigation system that flows into the Barren Box Swamp. The southern section is considerably more saline than the northern and there are some aquatic vegetation differences. There is very little recent information on the biology or physico-chemistry of either part of the lake. If you are interested in spending 2 - 3 hours on or in the lake and/or attending a BBQ on the lake shore please append a note to the bottom of the Registration Form 2 indicating what aspect of the study you would like to be involved in. More information about the study and the history of the lake will be supplied later.

VICTORIAN CHAPTER

Although not formally constituted the Victorian Chapter of A.S.L. has been quite active over the last year or so. In addition to the development of an invertebrate voucher identification system (see separate note in Oct 81 issue) we have been having regular beer appreciation gatherings (loosely termed "discussion meetings") which have been very well attended. Work load attached to the chapters' activities is shared between several people, and a minimum of formal organisation is involved.

The regular meetings were based on comments from Phil Suter regarding the functions a few years ago of a freshwater biologists' group in South Australia. They are essentially an opportunity for regular conversations in an informal atmosphere (the Gresham Hotel), between limnologists in the state, many of whom are tucked away in various government and semi-government organisations. A few after work drinks, plus a few before dinner drinks, plus the odd glass or two to aid digestion during the meal all help to put people in a relaxed frame of mind for a discussion paper delivered after the meal. Any loss of rapier sharpness in the speaker's presentation is nicely balanced by a total blunting of critical sense in the audience. Despite the conviviality of the meetings, some extremely interesting talks and discussions have been enjoyed, over a wide field, and a brief outline of topics presented is given below.

June 1980 — Water Chemistry of Magela Creek System, N.T.
Barry Hart (Caulfield Institute of Technology)

Barry highlighted in his talk some of the unusual features of flood-plain in Arnhem Land, and the dependence of chemical features upon seasonal changes in discharge. He also spoke of enclosure experiments on the fate of trace metals in the area, and their relevance to water quality monitoring.

August 1980 — Biological Studies of the Yarra Catchment
John Dean, David Cartwright (Board of Works)

John and David showed that an applied limnologist's life need not all be spent in routine water quality studies. They interspersed discriptions of reservoir monitoring and the counting of algal cells with graphic accounts of yabbie wrestling and the use of H.M.A.S. Melbourne in stream sampling. Taxonomic and life history studies on mayflies and caddisflies were described, as were large scale invertebrate studies. These have shown an interesting zonation pattern in chironomid species of soft substrata of the lower Yarra.

October 1980 — Chinook Salmon in Victoria
Peter Rogan (Fisheries and Wildlife)

Considerable discussion took place on the advisability or otherwise of deliberately extending the distribution of this species in Victoria. Peter pointed out that chinook salmon is an extremely popular angling fish, and that some lakes in western Victoria have been successfully stocked for years. He also discussed studies to assess the feasability of establishing non-breeding populations in Port Philip Bay, and the possible use of a "chemical marker" to bring them to a trapping point in the Yarra River.

December 1980 — Impact of Environmental Considerations on U.S.A. Reservoirs
Frank Burns (Consulting Engineer)

Recent legislation in the U.S.A. has forced planners to consider more critically the impact of reservoirs on the water quality in the river down-stream. The possibility of deterioration of the water quality in the reservoir due to stratification effects has been recognised. During his recent visit to the U.S.A. the speaker inspected the 41,000 ML capacity La Farge dam in S.W. Wisconsin which the U.S. Corps of Engineers was forced to abandon when almost completed due to such fears.

April 1981 Experimental Logging in Melbourne's Water Catchments
John Langford (Board of Works)

The long term studies at the Board's Coranderk catchment on forest management and water quality and quantity were described. The importance of logging roads as generators of sediment was noted, as was the short term increase, and longer term decrease, in water yield following clear felling. John pointed out that the specificity of logging and roading regulations, and the field supervision to enforce such regulations, are critical in preventing excessive sediment input to streams.

June 1981 Invertebrate Studies in the Magela Creek area, N.T.
Richard Marchant (National Museum)

Richard described his one year field programme involving monthly sampling of five billabongs. Very great seasonal effects were evident, with benthic fauna being richer and more abundant in late wet-early dry season. Invertebrate diversity and density seemed to be clearly tied to growth and senescence of macrophytes, especially in less permanent billabongs.

August 1981 Studies on Effects of Reservoir Construction on Stream Benthos
John Blyth, Gary Davey (National Museum)

The broad results of the long running Dartmouth survey were described, with emphasis on the effect of bed sedimentation and flow changes upon benthic invertebrates. Questions arising from observations at Dartmouth were specifically addressed in design of the Thomson River study. Gary described the approach taken to analyse the relationship of faunal changes to particular changes in bed structure, and the interactions between discharge, velocity, bed scouring, and invertebrate distribution.

October 1981 Trials and Tribulations of a Journal Editor
Lou Bennet, Meredith Dobbey (C.S.I.R.O.)

This talk is still to come at time of writing.

BOOK REVIEWS

TASMANIAN CADDIS-FLIES

Arturs Neboiss. 1981. 180 pp. Fauna of Tasmania Handbook No 4, Fauna of Tasmania Committee, University of Tasmania. Recommended price $5.75. Price per page: 3.2¢ (Available by post at $6.75 from Fauna of Tasmania Office, University of Tasmania, Box 252C, G.P.O., Hobart, Tasmania 7001).

Reviewed by I. Campbell.

This handbook is based heavily on the author's 1977 publication, "A taxonomic and zoogeographic study of Tasmanian caddis-flies" (Mem. Natn Mus. Vict., 38, 1-208), now out of print. The new publication consists substantially of the keys provided in the previous publication - however, these have been extended to the specific level in all cases and new species and revisions of Wells (1978, Aust. J. Zool., 26, 745-62; 1979, Aust. J. Zool., 27, 311-29; 1979, Aust. J. Zool., 27, 585-622) are included. The price is also considerably lower!

The publication consists of a brief introduction, a checklist of Tasmanian species, a note on collection and preservation and a useful summary of the structure of caddis-flies, all of which precede the keys. The keys are followed by distribution maps. Figures of critical taxonomic features are provided adjacent to the keys in the handbook, a distinct improvement over the National Museum publication; but the positioning of the distribution maps at the back is less convenient.

The text seems relatively free of typographical errors to one who is by no means expert on trichopteran nomenclature. The inclusion of the phylogenetic diagram of Ross (1956, Evolution and Classification of the Mountain Caddis-flies, Univ. Illinois Press) in the introduction, which refers to it a number of times, would, I feel, have been a useful inclusion.

The two major reservations I have about the book are, firstly, the lack of any ecological information. Even brief notes about the habitats of the

various species would have been invaluable to those of us with an ecological bent. And secondly, the timing. Neboiss has material from the south west which includes new species, and Wells (1981, Aust. J. Zool., 29, 103-8) has already made parts of the publication out of date. I can't help but feel that a delay of a couple of years may have led to a more valuable publication. However, with the success of the series so far, and in view of the unavailability of the author's previous work, a new edition will no doubt be required in a couple of years anyway.

AN ECOLOGICAL BASIS FOR WATER RESOURCE MANAGEMENT.

W.D. Williams (Editor). 1980, 417 pp. Australian National University Press, Canberra. Recommended price: $39.95 (hard-cover), $19.50 (soft cover). Price per page 8.5¢ (hard cover), 4.1¢ (soft cover).

Reviewed by R.W.G. White

I have seen "in press" citations to this book over the last three or so years so it was good to see it published at last. The list of contributors, 32 in all, reads like a list of "who's who" in Australian limnology. From greying eminences to dynamic youngsters, they all seem to be there. With such a competent line up of authors the reader would justifiably expect great things of the book. In part, he will be disappointed. Some contributions are very good indeed, others are routine and out of place in a major review publication of this type.

The book is edited by Bill Williams, who also contributes four of the 35 articles. Bill's experiences over the past years ably qualify him to edit a review of this type. I only wish that he had leant a bit harder on some of the less experienced contributors to provide articles more appropriate to the theme of the book. Bill alludes to the problems experienced by most editors in his preface where he mentions two non-forthcoming articles and the need to apply the "final squeeze on some few authors".

The book is divided into seven sections following the introductory chapter. These are 1. The nature of the resource (3 chapters), 2. Management problems (6 chapters), 3. Water usage (5 chapters), 4. The impact of man on inland waters (5 chapters), 5. Aquatic fauna (6 chapters). 6. Man-made lakes (5 chapters), and 7. Some special aquatic environments (4 chapters).

In the first section, 'The nature of the resource' I found some short comings. Firstly, surely the resource requires greater description than just accounts of the chemistry and benthos. Where are chapters on the phytoplankton and zooplankton? Were these the two non-forthcoming chapters mentioned in the preface? Their absence makes the section incomplete. Secondly, a detailed point about Timms' chapter on the benthos. This provides a useful review of the "state of the art" but there is one horrible blunder! A new scheme for relating the benthos of the biomass to lake trophic status is proposed, and this is a disaster! The whole concept of relating biomass of one community to trophy (i.e. nutrient dynamics) is wrong. If there is a relationship between nutrient cycling and biological communities it is in terms of the productivity of those communities. According to the scheme proposed by Timms the trophic status of Great Lake in central Tasmania, based on the biomass of the benthos would be super-super eutrophic! The mean benthic biomass of this lake can exceed 50 g/m^2. In Timms' scheme 8 g/m^2 is the LOWER limit for an eutrophic lake. The explanation, of course, is that the benthos of Great Lake is dominated by large, slow growing animals oligochaetes) with low P/B ratios. The distinction between biomass and production is one we hammer home in university first-year ecology courses. That such a confusion should have been allowed into this book is a pity. (To be fair, it also happens elsewhere - see Aust. J. mar. Freshwat. Res. 32(4), p. 543 where the method described under the heading of "Seston Productivity" is simply a biomass determination technique. What were the referees and editors thinking of when they let that one through?).

The next section (Management Problems) I found very good. The contribution here clearly demonstrate the role of the biologist in overcoming problems experienced by those concerned with water management. A few more accounts like these and the biologist would be less of the poor

relation of the engineer and chemist.

Section 3, 'Water Usage' continues in similar vein. Barry Hart's chapter, "Australian water quality criteria" is a very useful compilation. Its only short coming is one common to many of the articles; that is the absence of more recent work. The main cut-off point for the literature seems to be 1977 with just a few 1978 references. Several important studies have since been published (e.g. Lake et al. 1979, Lethal and sublethal effects of cadmium on freshwater crustaceans. AWRC Tech. Pap. 37.)

The two following chapters in this section deal with public health aspects of water usage (Forsyth) and aquatic vectors and hosts of medically important diseases (Petr). Both chapters enlightened the reviewer to important aspects not usually dealt with in limnological texts.

Strom's chapters, 'Waste water as a resource' reflects on a topic which must become increasingly important as man's demand for water expands. The eight references in this chapter are all to Australian works. One is loathe to push non-Australian work for the sake of it, but it is unarguable that the re-use of waste water is much more advanced in Europe and North America. Some reference to experiences in these regions (e.g. Institution of Public Health Engineers 1974, "Sewage water as a water resource") would have been useful.

Part IV, 'The Impact of Man on Inland Waters' includes a lucid essay on conservation by Lake and several detailed case-histories and two excellent reviews, one on biological monitoring (Williams) and the other on environmental surveys (Hart). Both the latter chapters should be compulsory pre-reading for anyone contemplating a biological survey of an aquatic habitat.

The contributions to Part V, 'Aquatic Fauna' are variable in length and quality. Several of the chapters consist of relatively tedious surveys of faunal groups with little attempt at drawing out any general principals or concepts. The chapter 'Management of freshwater fish and fisheries' by Pollard, Llewellyn and Tilzey is by far the longest in the book. It could easily have been shorter. There is too much on the general biology of the species which is repeated, often in with further details in McDowall's (1980)"Freshwater Fishes of South-eastern Australia". All three authors are also contributors to the McDowall text so they would have been fully

aware of the coverage of that text.

Part VI is entitled 'Man-made Lakes'. Again good accounts of some of the best investigated systems are presented. My only comment here is that I do not agree with the idea presented in Powling's Fig. 43 that the thermocline sits firstly on the bottom of the lake, then at the surface during and after overturn. Surely the thermocline is destroyed when a lake becomes isothermal.

The placement of some of the chapters into the final section, 'some special aquatic environments' is strange. Farm dams (Timms) and waste stabilisation ponds (Mitchell) would have been equally at home in the previous section on man-made lakes. The disappointing chapter here is the point by Shiel on billabongs. Shiel is a definite "chip-off-the-old-block" and follows Bill Williams' example in maximising the publication of his work. I commend this approach, but I see little point in presenting detailed species lists in a book such as the one being reviewed here when that information is already available in the literature.

There is no concluding chapter and that is a pity. A brief look forward to the future with some suggestions for the role of the biologist would have been interesting.

On the technical side I think the presentation of the book is poor. The text is relatively free of typographical errors but the whole style is relatively dated. Book design has improved greatly over the last ten years but ANU Press seems to be unaware of this. Several of the figures are poorly printed (e.g. Fig.26) and the quality of some of the photographs is horrible (e.g. Plate XV).

In conclusion, this is a useful text which will be widely read. I think it could have benefited from more rigorous editing but, nevertheless, I recommend the book as good value-for-money and an informative compendium.

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ASL SUBMISSION TO AWRC

ASL has made a submission to the Australian Water Research Council's working group which is reviewing water research in Australia. The Society's submission is printed below.

Preamble

The Australian Society for Limnology is an association of over 425 people with professional or amateur interests related to Australian inland waters. Since its inception in 1961 the Society has vigorously promoted the role of limnological research and education in Australia by the organization of conferences and by the publication of a Newsletter, a Bulletin and a series of Special Publications. The Society also has a strong interest in the management and conservation of aquatic resources.

Introduction

Although Australia is the driest inhabited continent, we know surprisingly little about its aquatic resources. Whilst considerable emphasis has been placed on water resource availability and the best means of managing and utilizing water resources from a supply perspective, we are relatively ignorant about many other fundamental properties of our aquatic resources.

The Australian Society for Limnology submits that:

1) There is insufficient limnological knowledge of Australia's inland water resources at both the level of fundamental research and at the applied level. In particular, there is a very poor understanding of the dynamic processes operating in aquatic ecosystems and the interactions between biological, chemical and physical components.

2) Water research in Australia is fragmented and conducted under the auspices of numerous government bodies, tertiary institutions and, to the lesser extent, private industry. There is a strong need for well defined national priorities to be developed as a basis for funding and encouraging aquatic

research. A series of limnological research centres should be established.

3) If coherant the useful research is to be conducted at both the basic and the applied levels, the funding of long term projects, in the order of ten years, is essential.

1. Limnological Knowledge.

Many aspects of limnological work are hampered by a lack of basic information. In ecological studies, the inadequate taxonomic status of much of the freshwater biota limits the usefulness of the studies. In pollution studies the lack of toxicity on Australian freshwater organisms is a major deficiency. Overseas data are in no way an adequate substitute. Likewise, our limited understanding of the relationship and interactions between light, nutrients, turbidity and plant growth retards eutrophication research. Assessment, and prediction, of the environmental impacts of developments in and around inland waters is hampered by the absence of adequate base line studies of unaltered aquatic ecosystems.

Lack of basic research is currently inhibiting the development of applied aspects of limnology within Australia. There needs to be recognition of the fact that the usefulness of applied limnology is directly related to the adequacy of the fundamental knowledge upon which it is based.

Many current investigations concentrate on monitoring aquatic ecosystems. This is understandable, particularly so in programmes mounted by government instrumentalities. Yet exhaustive monitoring rarely leads to enlightenment. In the long term it may be better to utilize resources in such a way that our understanding of the functioning of aquatic systems is enhanced. In this way real solutions to problems are likely to be forthcoming. An added advantage of understanding systems is that more realistic and cost effective monitoring programs will result.

In addition to the applied limnological aspects, there is a need to recognize the fact that inland waters are important systems for fundamental ecological research. Australia contains some limnologically unique habitats

and numerous endemic aquatic species. Many Australian aquatic organisms are of great international scientific importance for biogeographical reasons. Many more are apparently little changed from ancestral forms and may help to elucidate evolutionary patterns. Yet in many cases we know almost nothing about the species, their habitat requirements, or appropriate management strategies for their conservation.

2. Fragmentation of research.

Limnological research in Australia is extremely poorly funded compared with marine research and is conducted by individuals and small groups scattered throughout numerous organisations. Whilst the Australian Society for Limnology does not wish to suggest that research by groups should in anyway be stifled it is critical that national recognition of the importance of research on inland waters is forthcoming.

It is clear that water research would greatly benefit from increased levels of funding. In order that any additional funds are most effectively used they should be dispersed according to a set of national priorities. The priorities could be expressed as types of habitats, particular processes, geographical areas, groups of organisms or some combination of the above, which are particularly in need of study.

There are two specific suggestions we would like to make in relation to AWRC funding of water research:

1) That funding be restricted to research projects, as opposed to monitoring programmes. Routine monitoring programmes should be conducted and funded by appropriate government authorities. Where a new development eg. a storage reservoir is proposed, monitoring for baseline data and any changes associated with the development should be funded by the developing authority. For example, in Victoria the MMBW has funded an investigation into the impact of the Thompson Dam project on benthic invertebrates in the river.

2) That there is a special case for establishing and funding multidiscipline limnological research centres in Australia.

Because of the uniqueness of the biota, biological knowledge gained overseas is not directly applicable to Australian conditions. This is not the case for physico-chemical and hydrological information. Although we do not wish to imply that Australia should rely on overseas research for information on physico-chemical and hydrological factors, we want to stress that in view of the lack of applicability of overseas biological information relatively greater emphasis should be given to biological studies. We are using the term biological in a very broad sense to refer to all aspects of limnological study which involve living organisms. Limnology involves the study of interactions between living and nonliving components of the ecosystems and it is these interactions which cannot be predicted from overseas information. An example which clarifies this point is the general inapplicability in Australia of the results of Northern Hemisphere research on eutrophication.

In order to facilitate the limnological research which is necessary to supplement our existing meagre knowledge, we would like to propose the establishment of a series of research centres. It would seem appropriate to establish research centres based on habitat type and area of study. For example, the following specialised centres could be set up:

1. Lake and Reservoir Research Centre
2. River and Stream Research Centre
3. Wetlands Research Centre
4. Tropical Limnology Research Centre
5. River Murray Research Centre
6. South-West W.A. Research Centre

Because it is essential to study the interactions between the living and nonliving components of aquatic systems, the research staff at such centres should include at least chemists and biologists so that multidisciplinary studies can be conducted.

The above approach minimizes the likelihood of overlap and repetition in research and emphasises the areas which should be given highest priority.

The proposed limnological research centres should be established and funded by the AWRC with priorities and guidelines for research being determined by the AWRC advisory body on limnological research. The Australian Society for Limnology would be more than happy to provide a nominee for such an advisory body.
Detailed suggestions for the method of establishing limnological research centres are given in Appendix I.

3. Long term funding

The usefulness of baseline data and fundamental limnological research are related to the length of time over which studies are conducted. For example, there have been no long term studies on the invertebrate fauna of Australian rivers. Hence it is almost impossible to distinguish between natural fluctuations in faunal composition and changes which may be due to mild stress eg. organic pollution.
The Australian environment and climatic regime are also highly variable and it should not be expected that short term projects of two to three years will provide adequate answers.
Long term funding is also an important consideration when examining the efficiency of resource usage in water research, in particular, the use of highly trained human resources (research students and scientists). There is an increasing trend towards funding short term, specific projects. Such an approach enables the students and research scientist to gain expertise and skills in a particular area of aquatic research. However unless further research funds are forthcoming, this human resource is wasted as the people concerned move to other areas of the workforce which provide greater job security.

Conclusion

In conclusion we would like to reiterate the need for greatly increased funding of limnological research on Australian inland waters, particularly long term and multidiscipline studies. For too long limnology has been neglected in favour of other areas of water research.

APPENDIX I: ESTABLISHMENT OF CENTRES FOR LIMNOLOGICAL RESEARCH

As outlined in the body of the submission, we are proposing the establishment of six centres for limnological research on the following areas of study.

1. Lakes and Reservoirs
2. Rivers and Streams
3. Wetlands
4. Tropical Limnology
5. River Murray
6. South-West W.A.

Because a number of institutions are already actively engaged in limnological research and thus have the necessary equipment, library facilities and experienced personnel, it would appear that the most effective way of establishing research centres would be to set them up in association with existing institutions, be they tertiary institutions or government bodies such as CSIRO. Although such centres could be attached to pre existing institutions they would retain autonomy and independent funding.

The role of the research centres could be as follows:

1) Long term research funded by AWRC etc
2) Short term consulting with consulting fee covering all costs, rather than the centre effectively subsidizing consulting work as often happens at tertiary institutions.
3) Direct advisory service to government authorities etc
4) Research advisory service capable of providing information on proposed research programmes
5) Educational, in terms of providing facilities for postgraduate research, limnology study groups, conferences, short workshops etc.

For limnology research centres to be viable it is essential that a substantial and ongoing portion of their funding be on a long term basis

APPENDIX I (cont)

from an organisation such as AWRC.

A precident for the establishment of such a Research Centre would be that being considered by the Federal Government for the Australian Corrosion Association.